

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions of claims in the application.

1. (Currently amended): A high-purity high-hardness ultrafine-grain diamond sintered body consisting essentially of ultrafine-grain natural diamond powder having a grain size of 100 nm or less, ~~which is produced by subjecting an ultrafine-grain natural diamond powder having a grading range of zero to 0.1 μ m, wherein said diamond sintered body has Vickers hardness of 80GPa and more, and is produced by:~~

subjecting ultrafine-grain natural diamond powder having a grading range of zero to 0.1 μ m to a desilication treatment, freeze-drying the desilicated powder in solution;
dispersing the desilicated diamond powder in aqueous solution;
freezing the aqueous solution thereby obtaining ice dispersed with diamond powder;
subliming the ice thereby obtaining freeze-dried diamond powder; and
sintering the freeze-dried powder without a sintering aid.

2. (Original): The high-purity high-hardness ultrafine-grain diamond sintered body as defined in claim 1, which has light-transparency.

3. (Currently amended): A method of producing a high-purity high-hardness ultrafine-grain diamond sintered body, comprising the steps of:

subjecting an ultrafine-grain natural diamond powder having a grading range of zero to 0.1 μm to a desilication treatment; ~~freeze-drying the desilicated powder in solution;~~

dispersing the desilicated diamond powder in aqueous solution;

freezing the solution thereby obtaining ice dispersed with diamond powder;

subliming the ice thereby obtaining freeze-dried diamond powder;

enclosing the freeze-dried powder consisting essentially of ultrafine-grain natural diamond powder in a Ta or Mo capsule; and

heating and pressurizing the capsule using an ultrahigh-pressure synthesizing apparatus at a temperature of 1700°C or more and under a pressure of 8.5 GPa or more, which meet the conditions for diamond to be thermodynamically stable, so as to sinter the freeze-dried powder.

4. (Original): The method as defined in claim 3, wherein said heating and pressurizing step is performed at a temperature of 2150°C or more and under a pressure of 8.5 GPa or more, whereby the sintered body has light-transparency.